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ABSTRACT

This study manipulated the relations between target and cue words in two cued-recall experiments with children based on the assumptions that: (1) the target cue relations that are most consistent with a child's semantic memory organization result in the highest levels of recall, and that (2) the optimal target-cue relationships may change with age, reflecting changes in semantic structure. In the first experiment, kindergarten, third and sixth graders were orally presented with three 12-item lists of unrelated words for cued recall. Acoustic, categorical, and functional cues were provided. Responses indicated significantly greater performance with category cues relative to functional and acoustic cues at all grade levels. In the second experiment kindergarten, third and sixth grade children, and college students were given two 15-item lists for cued recall. One-third of the items in each list were category typical items cued by category labels; one-third were atypical items cued by their category labels, and one-third were familiar nouns cued by unrelated words. Results of this experiment indicated that recall with typical items was greater than recall with atypical items for all ages, and that the difference between typical and atypical items generally decreased with age. (CM)

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Children's Cued Retrieval and the Structure of Semantic Memory

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Florida Atlantic University

Paper presented at Southeastern Conference on Human Development, Atlanta, Georgia, April 1978

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Children's Cued Retrieval and the Structure of Semantic Memory

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In experiments of cued-recall, subjects are given sets of items, with each item customarily being paired at input with a "cue" word. At time of output, subjects are given these (or other) cues and are told to use the cues to aid their recall of the target items. In work with adults, Tulving and his associates (e.g., Tulving & Thompson, 1973) have demonstrated that how a particular item is encoded at time of presentation will affect the efficacy of a subsequent retrieval cue. However, research both preceeding and following Tulving's work indicates that the perceived relationship between the target and cue words is an important part of the "encoding environment." That is, and not surprisingly, adult subjects make use of information they possess in semantic memory to facilitate task performance. Target-cue relations that are highly "salient" -- that fit well with a subject's semantic memory structure -- produce high levels of recall performance, whereas target-cue relations that are less salient or less consistent with a subject's semantic memory organization, result in lower levels of recall.

The present study manipulated the relations between target and cue words in two cued-recall experiments with children. It was assumed that the target-cue relations that are most consistent with a child's semantic memory organization would result in the highest levels of recall, and that the optimal target-cue relationships may change with age, reflecting changes in semantic

memory structure.

In the first experiment, three types of relations were investigated: acoustic, categorical, and functional. These relations were selected based upon previous research suggesting possible developmental differences in children's use of acoustic, categorical, and functional features. For example, a substantial amount of research has been done concerning age differences in acoustic and semantic word processing. The general consensus of this literature seems to be that children much younger than 8-years of age show a "preference" for encoding words on the basis of acoustic features, giving the sound characteristics of words processing priority, whereas by the age of 10 or 11, children give semantic word features "dominance" (see Gibson, 1971). This, of course, doesn't mean that young children don't attend to or process word meaning. Research evidence and common sense demonstrate that they clearly do. Rather, these findings reflect developmental changes in the dominance or saliency that acoustic versus semantic word features have for children of different ages. Functional relations were included for investigation in this experiment because of the claim that children's early word concepts often are based on the intrinsic or extrinsic functions or actions of an object (Anglin, 1977; Nelson, 1974). What an object does or what can be done to it, would seem to be highly salient features that could be used as a basis for encoding and/or interpreting words.

In the first experiment, kindergarten, third, and sixth grade children were orally presented with three 12-item lists of unrelated words for cued-recall. One-third of the target items in each list were paired at input with a superordinate category label (e.g., FURNITURE -- couch), one-third with a rhyming word (e.g., HOLLY -- collie), and one-third with a functional cue

(e.g., CUT -- knife). Subjects were read the word pairs, which they repeated, and were told that the first word in each pair was a "hint" word that would be presented later to help them remember the "real" or target word. Subjects were told ahead of time that the target and cue words would be related in one of three ways (acoustically, categorically or functionally), although they were not informed how any specific pair of words was related. At time of output, the experimenter read each cue, one at a time, with the subject trying to recall the target words. A separate group of control subjects at each grade level was presented with unrelated cue words (e.g., DESK -- bus) in order to assess levels of cued-recall when no obvious relation exists between the target and cue words.

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Insert Figure 1 Here

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Figure 1 presents levels of cued-recall for children in Experiment 1. As can be seen, at all grade levels, recall was greatest with the superordinate category cues, intermediate with the functional cues, and poorest with the acoustic cues. However, the patterns of performance varied somewhat with age. For the kindergarten children, recall with the superordinate category labels was not significantly different from recall with the functional cues, demonstrating the potential importance of functional features for young children. At the third grade level, recall with the category labels was significantly greater than recall with the functional cues which was not differentiated from the acoustic cues. For the sixth graders, recall with the category labels was significantly greater than recall with the functional cues, which in turn, was significantly greater than recall with the acoustic cues.

The finding of significantly greater performance with the category cues relative to the acoustic cues at all grade levels is seemingly inconsistent with the literature indicating a shift from acoustic to semantic "feature dominance." However, these results are in line with other developmental research. For example, in a recent depth-of-processing experiment, Geis and Hall (1976) have shown that a semantic orienting task produced higher levels of recall than an acoustic orienting task even for 6-year old children who presumably "prefer" to encode words on the basis of acoustic features. However, in the present experiment, kindergarten children's recall with acoustic cues was especially low. In fact, kindergarten children's recall with acoustic cues was not significantly greater than recall of control subjects receiving unrelated cues.

This does not mean, however, that these 5-year old children were unattentive to the auditory characteristics of the target and cue words. In fact, an examination of intrusions, words "recalled" that were not on the list, demonstrate that these children were highly attentive to acoustic word features. Figure 2 presents the number of acoustic versus non-acoustic intrusions made by subjects at each grade level. An acoustic intrusion was defined as any incorrect response that rhymed with the cue word. As can be seen, kindergarten children made a proportionately greater number of acoustic intrusions than did the older children, $\chi^2(2) = 16.69$, $p<.01$. These data indicate that although acoustic cues are ineffective in eliciting <u>correct</u> recall for subjects of all ages (relative to categorical cues), they serve to elicit <u>incorrect</u> retrieval in kindergarten children. Kindergarten children's especially poor performance with acoustic cues may result because they are more oriented toward acoustic properties of words than are older children,

and are thus less able to discriminate effectively acoustically-related words. As such, a potential acoustic response is "less unique" for these children and therefore more prone to being confused.

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Insert Figure 2 here

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Another finding of interest in this experiment was the apparent age differences in recall with the category labels depending on how "typical" the target items were of their categories. For example, age differences in recall were minimal for items that were clearly "good" category exemplars (e.g., shirt for CLOTHING; bus for VEHICLE; drum for MUSICAL INSTRUMENTS; couch for FURNITURE). In contrast, differences in recall were greater for items that seemed to be atypical of their categories (e.g., shoes for CLOTHING; soup for FOOD; hawk for BIRD). That is, although typicality was not manipulated in this experiment, an after-the-fact inspection revealed possible developmental differences in cued-recall as a function of category typicality. Such a finding is consistent with recent data and theory indicating that children acquire words for typical category members prior to atypical ones (Anglin, 1977; Rosch, 1973; Saltz, Soller & Sigel, 1972). Accordingly, even though young children may "know" that a shoe is clothing, they may be less apt than older children to categorize such atypical items in terms of their superordinate relative to more typical category exemplars. This question was addressed in a second experiment.

In the second experiment, children from the kindergarten, third, and sixth grades, and college students were given two 15-item lists for cued-recall. One-third of the items in each list were category typical items cued

by category labels, one-third category atypical items cued by their category labels, and one-third were familiar nouns cued by unrelated words. It was predicted that levels of cued-recall would be greater for the category typical than the atypical items at all ages, but that recall differences between the typical and atypical materials would decrease with age.

Figure 3 presents the results of this experiment. First of all, for all ages, recall with the typical items was greater than recall with the atypical items. This result is consistent with the findings of Elenor Rosch and her colleagues. Rosch claims that categories are defined in terms of a prototype, or best example, and that typical items are more similar to the prototype than are atypical items. Accordingly, the greater similarity between the prototype (here represented by the category label) and the typical rather than the atypical items, should result in greater ease of encoding the typical members in terms of general category features, and thus in more efficient retrieval.

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Insert Figure 3 Here

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Also, the difference between the typical and atypical items generally <u>decreased</u> with age, thus providing some preliminary support for our hypothesis. However, this result must be interpreted cautiously for two reasons. First of all, the critical age X cue-type interaction did not reach conventional levels of statistical reliability, $p = .08$; and second, there is a possible ceiling effect for recall with the typical items for the sixth grade and college subjects, thus ambiguating any developmental interpretation of the data. Future research will attempt to eliminate this ceiling effect in order to better evaluate developmental differences in children's encoding and retrieval of typical and atypical exemplars.

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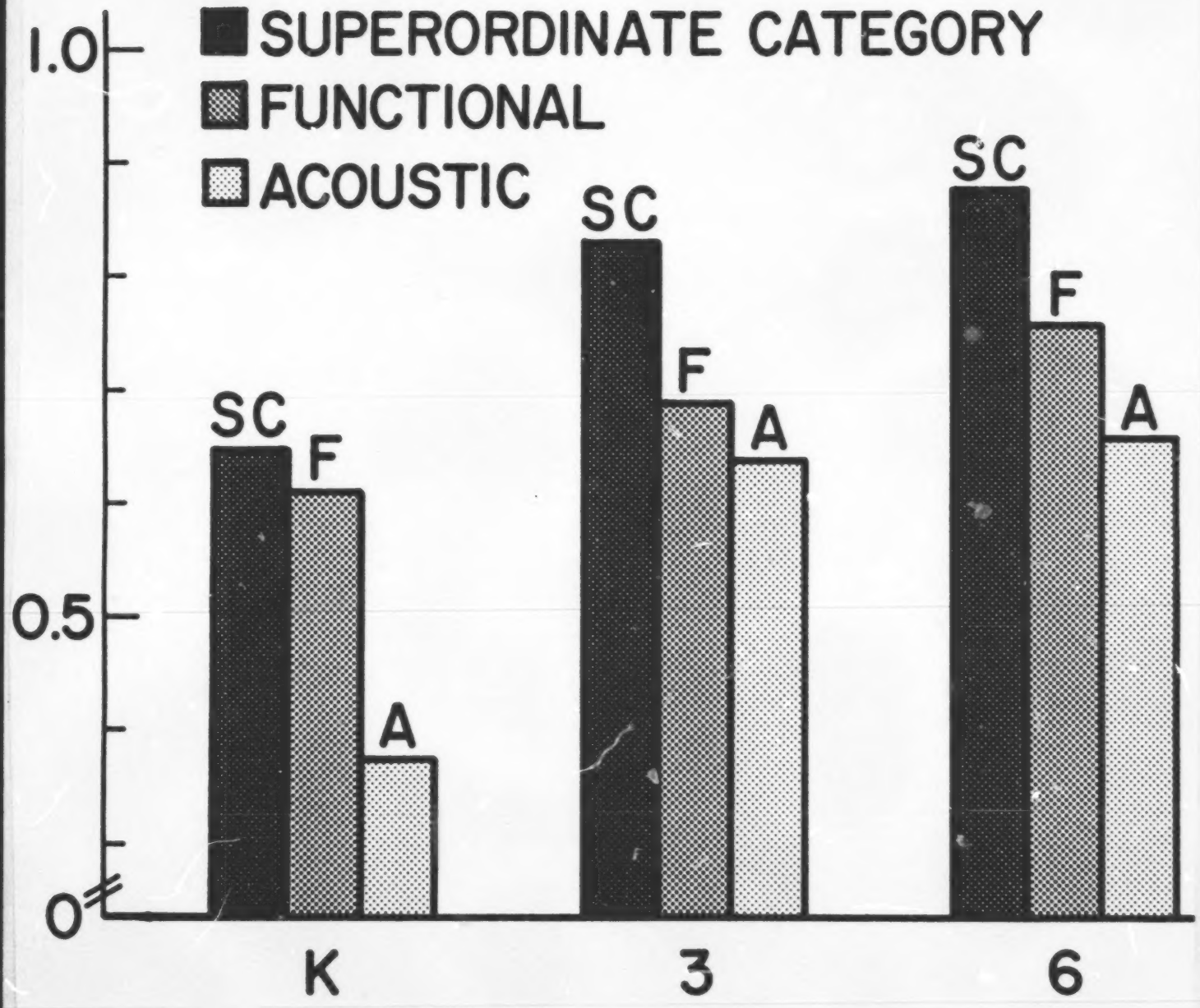
Figure Captions

Figure 1: Proportion of items recalled by grade and cue-type: Experiment 1

Figure 2: Number of acoustic and non-acoustic intrusions by grade: Experiment 1

Figure 3: Proportion of items recalled by grade and cuing condition: Experiment 2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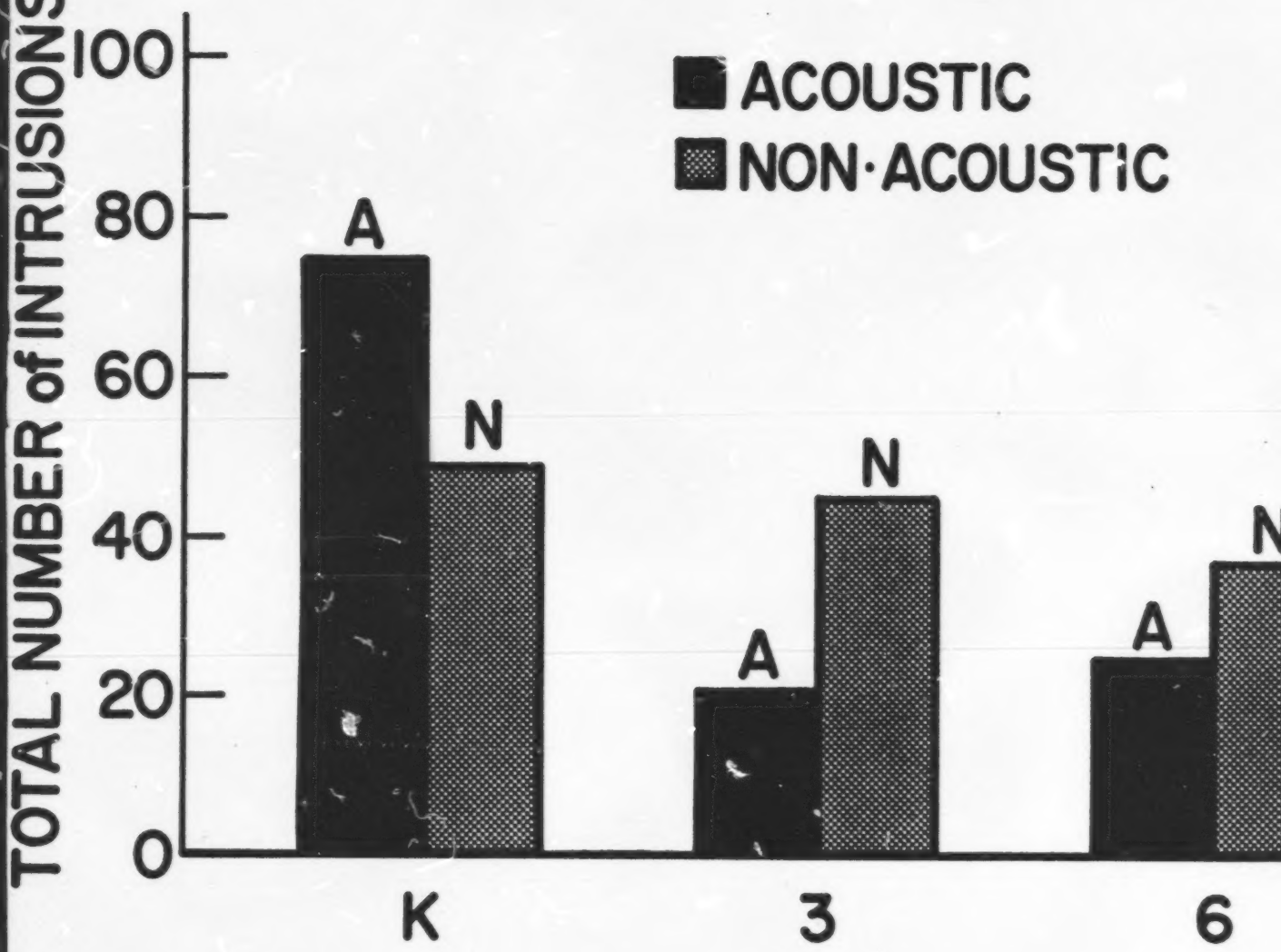
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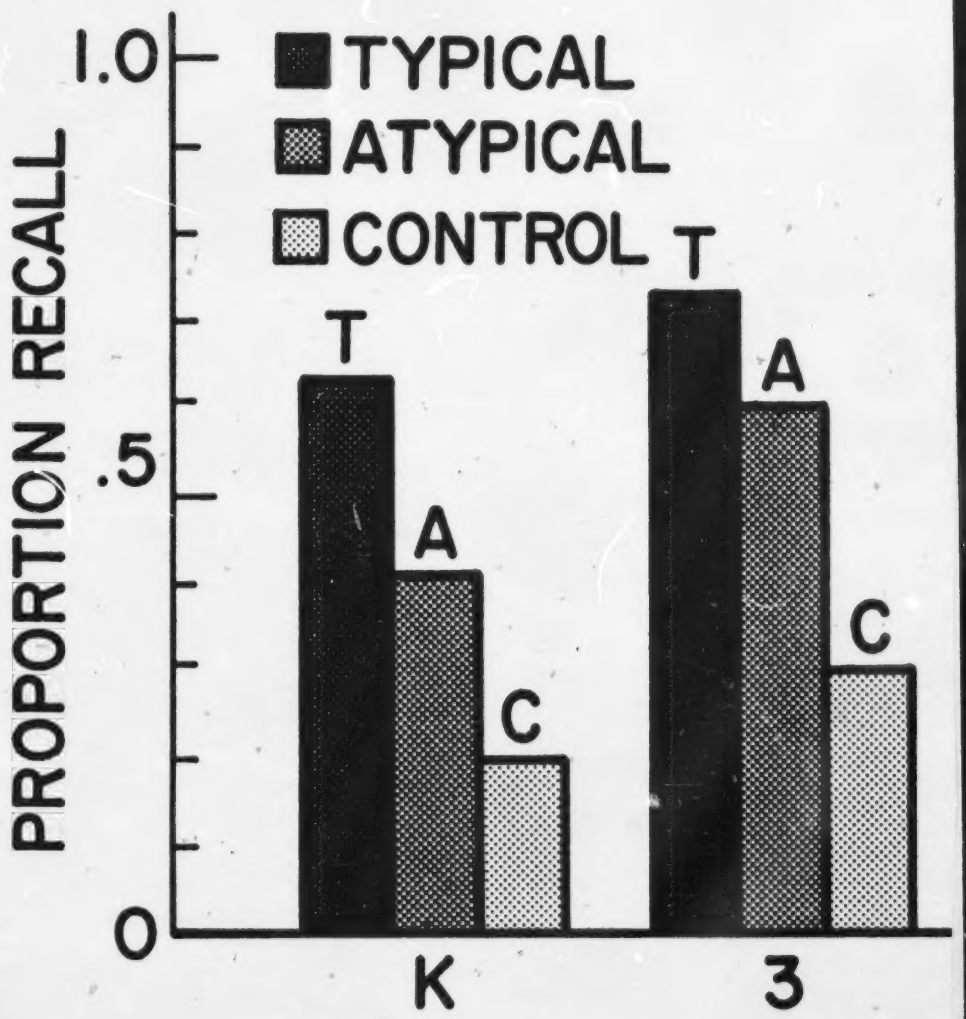
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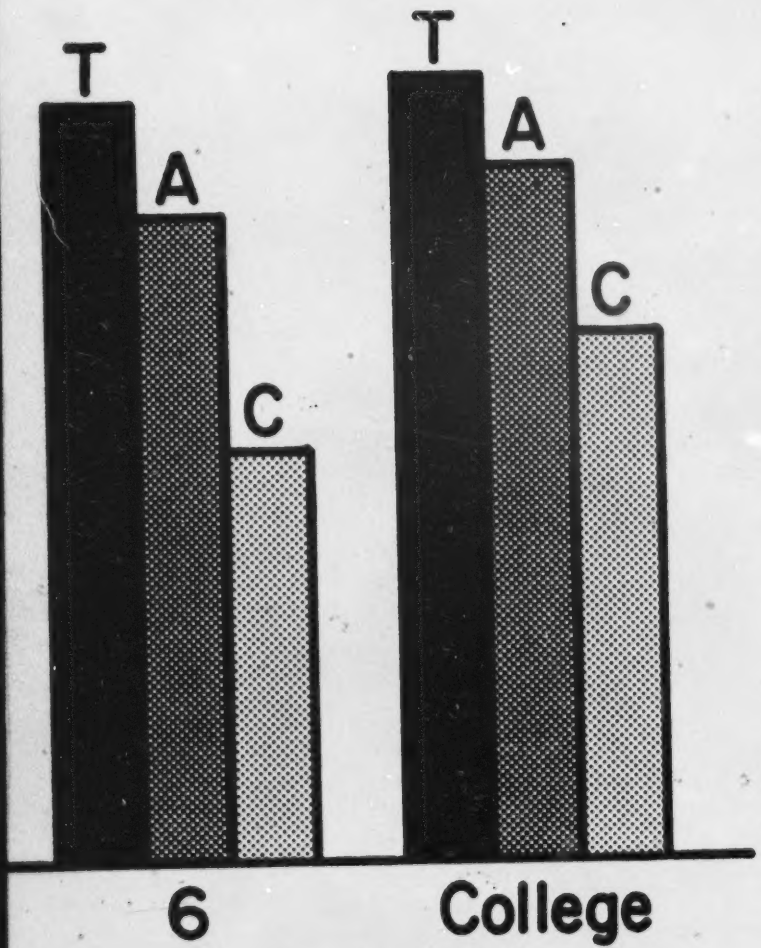
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